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BEFORE THE ARIZONA CORPORATION COMMISSION

COMMISSIONERS

MIKE GLEASON, Chairman
WILLIAM A. MUNDELL
JEFF HATCH-MILLER
KRISTIN K. MAYES
GARY PIERCE

IN THE MATTER OF THE APPLICATION OF SOUTHWEST GAS CORPORATION FOR THE ESTABLISHMENT OF JUST AND REASONABLE RATES AND CHARGES DESIGNED TO REALIZE A REASONABLE RATE OF RETURN ON THE FAIR VALUE OF ITS PROPERTIES THROUGHOUT ARIZONA.	Docket No. G-01551A-07-0504 **NOTICE OF FILING TESTIMONY**

Notice is given that the Arizona Investment Council has filed the Direct Testimony of Daniel G. Hansen, Ph.D. on its behalf in the above-entitled docket. Dr. Hansen's resumé is attached to his Direct Testimony as Exhibit DGH-1.

RESPECTFULLY SUBMITTED this 11th day of April, 2008.

GALLAGHER & KENNEDY, P.A.

By _____
Michael M. Grant
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Original and 13 copies filed this 11th day of April, 2008, with:

Docket Control
Arizona Corporation Commission
1200 West Washington
Phoenix, Arizona 85007

Arizona Corporation Commission
DOCKETED
APR 11 2008
DOCKETED BY

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Phoenix, Arizona 85007

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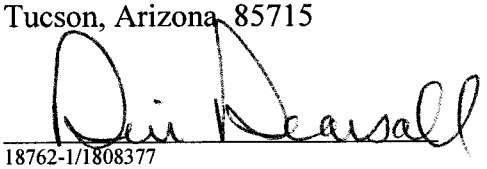

18762-1/1808377

BEFORE THE ARIZONA CORPORATION COMMISSION

COMMISSIONERS

MIKE GLEASON, Chairman
WILLIAM A. MUNDELL
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IN THE MATTER OF THE APPLICATION OF SOUTHWEST GAS CORPORATION FOR THE ESTABLISHMENT OF JUST AND REASONABLE RATES AND CHARGES DESIGNED TO REALIZE A REASONABLE RATE OF RETURN ON THE FAIR VALUE OF ITS PROPERTIES THROUGHOUT ARIZONA.	DOCKET NO. G-01551A-07-0504

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Direct Testimony of

Daniel G. Hansen, Ph.D.

on Behalf of

Arizona Investment Council

April 11, 2008

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TABLE OF CONTENTS

1. INTRODUCTION

Q. PLEASE STATE YOUR NAME AND ADDRESS.

A. My name is Daniel G. Hansen. My business address is 4610 University Avenue, Suite 700, Madison, Wisconsin 53705.

Q. WHAT IS YOUR PROFESSION AND BACKGROUND?

A. I am a Vice President at Laurits R. Christensen Associates, Inc. I received a Ph.D. in Economics from Michigan State University in 1997, at which time I joined Laurits R. Christensen Associates, Inc. I have worked primarily with the energy industry during my 11 years of consulting. In 2005, I conducted independent evaluations of Northwest Natural Gas's decoupling and weather normalization mechanisms in Oregon, as required by that Commission's Orders approving the mechanisms. Last year, I provided testimony on behalf of the Utah Division of Public Utilities regarding Questar Gas Company's decoupling mechanism. On behalf of Environment Northeast (a non-profit environmental organization), I provided testimony regarding a decoupling mechanism proposed by Connecticut Light & Power and also served on a panel before the Massachusetts Department of Public Utilities to discuss the merits of decoupling mechanisms (Docket 07-50). My resume is attached as AIC Exhibit No. __ (DGH-1).

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. The Arizona Investment Council ("AIC") has retained Christensen Associates Energy Consulting, LLC, a subsidiary of Laurits R. Christensen Associates, Inc., to provide testimony regarding the Revenue Decoupling Adjustment Provision ("RDAP") and the

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Weather Normalization Adjustment Provision ("WNAP") proposed by Southwest Gas Corporation ("Southwest Gas" or "the Company"). The aspects of these mechanisms that this testimony will address are:

- How RDAP addresses utility incentives to promote conservation and energy efficiency without significantly altering the customer-level incentive to conserve;
- Other benefits associated with RDAP;
- How WNAP reduces risk for both the utility and its customers; and
- How a combination of RDAP and WNAP can be particularly effective.

2. THE REVENUE DECOUPLING ADJUSTMENT PROVISION

Q. WHAT IS THE PURPOSE OF A DECOUPLING MECHANISM?

A. Decoupling mechanisms are primarily intended to reduce or eliminate a utility's disincentive to promote conservation and energy efficiency. For this reason, environmental organizations such as the Natural Resources Defense Council[1] and Environment Northeast support decoupling. At the same time, decoupling mechanisms reduce the variability of utility non-gas revenues. In the case of Southwest Gas's proposed RDAP, the Company would recover a fixed amount of non-gas revenues per customer served.

[1] "Joint Statement of the American Gas Association and the Natural Resources Defense Council", July 2004.

Q. PLEASE DESCRIBE THE COMPANY'S DISINCENTIVE TO PROMOTE CONSERVATION AND ENERGY EFFICIENCY THAT EXISTS UNDER ITS CURRENT NON-GAS RATES.

A. The disincentive is created because traditional rate designs require the utility to recover the majority of its non-gas costs, which are largely fixed costs, through volumetric rates. A reduction in sales leads to a reduction in non-gas revenues, but does not lead to a matching reduction in non-gas, i.e., primarily fixed, costs. Therefore, under its current non-gas rates, the Company's realized rate of return is tied to sales levels. Lower sales levels lead to a lower rate of return and higher sales levels lead to a higher rate of return. This traditional design leads to a game of chance as to whether customer usage patterns and weather patterns will actually allow the utility to recover its fixed costs, which do not fluctuate with those weather or usage patterns.

Q. PLEASE DESCRIBE THE COMPANY'S PROPOSED REVENUE DECOUPLING ADJUSTMENT PROVISION.

A. The RDAP is a standard revenue per customer decoupling mechanism in which the Company's allowed monthly non-gas revenues are equal to the number of customers in the billing month multiplied by the allowed margin per customer in that month. The *allowed* non-gas revenue is compared to the *actual* non-gas revenue billed and the difference is entered into the RDAP Balancing Account ("RDAP BA"). An over-recovery of non-gas revenue (i.e., when actual non-gas revenue exceeds allowed non-gas revenue) produces a credit in the RDAP BA, reducing the non-gas rate in the following year. An under-recovery of non-gas revenue (i.e., when actual non-gas revenue is less

than allowed non-gas revenue) produces a debit in the RDAP BA, increasing the non-gas rate in the following year.

Q. HOW DOES RDAP ADDRESS THE COMPANY'S DISINCENTIVE TO PROMOTE CONSERVATION AND ENERGY EFFICIENCY?

A. RDAP removes the link between the Company's sales and revenues. Under RDAP, Southwest Gas recovers the level of revenue per customer approved for the RDAP tariff, regardless of the level of sales per customer. Therefore, when RDAP is in place, the Company's realized rate of return is not adversely affected by the success of conservation or energy efficiency programs.

Q. HAS THE REVENUE PER CUSTOMER RDAP DESIGN PROPOSED BY SOUTHWEST GAS BEEN USED IN OTHER JURISDICTIONS?

A. Yes, the revenue per customer design is the most common form of decoupling that I have observed. The per-customer concept has been used by Vectren Energy in Indiana and Ohio; Cascade Natural Gas in Washington and Oregon; Piedmont Natural Gas in North Carolina; Baltimore Gas & Electric in Maryland; New Jersey Natural Gas; Washington Gas in Maryland; South Jersey Gas; Questar Gas in Utah; and Northwest Natural Gas in Oregon. Although there are differences between these decoupling mechanisms, they all tie the level of non-gas revenues to the number of customers in the current month or year.

Q. HOW DOES DECOUPLING AFFECT THE RATEPAYERS' INCENTIVE TO ENGAGE IN CONSERVATION OR ENERGY EFFICIENCY?

A. Decoupling has essentially no effect on an individual ratepayer's incentive to conserve energy and may actually increase the customer-level incentive to conserve. To see this, consider what happens to a residential customer's bill when they conserve energy with and without decoupling. Suppose a G-5 customer would typically consume 35 therms in January, but is assessing the benefits (under current rates) of reducing usage to 30 therms. Whether decoupling is present or not, the reduction in usage would reduce the customer's January non-gas bill by $2.71 (= $0.542 per therm x 5-therm reduction). With a decoupling mechanism in place, the $2.71 bill reduction goes into the RDAP BA to be recovered in the following year. However, this $2.71 will be paid by *all* G-5 customers in the following year, so that the bills for the conserving customer will be essentially unchanged by the presence of decoupling.

Q. DOES THE EXAMPLE ABOVE STILL WORK IF MORE THAN ONE RATEPAYER AT A TIME CONSERVES ENERGY?

A. Yes. The only thing that a ratepayer can control is whether he or she engages in conservation or energy efficiency activities. Because the "true-up" of non-gas revenue through the decoupling mechanism is almost entirely paid by other ratepayers, the individual-level incentive to conserve is not affected. If many or most of the ratepayers also decide to conserve energy, decoupling could lead to an increase in rates in the following year. However, that higher rate only *increases* the customer-level incentive to engage in long-term conservation and energy efficiency activities.

Q. IT SEEMS COUNTER-INTUITIVE THAT DECOUPLING COULD INCREASE THE CUSTOMER-LEVEL INCENTIVE TO CONSERVE. COULD YOU PLEASE EXPLAIN THIS IN MORE DETAIL?

A. Yes. Consider an example in which a conservation program causes 20% of the customers to reduce usage by 20% each, which would lead to a 4% decrease in total usage (= 0.2 x -0.2). Assume that this leads to a reduction in non-gas revenue of 4% (it will actually be less than that because some non-gas revenue comes from the fixed monthly charge). All of the customers, including the 20% who conserve and the 80% who do not, will pay the standard tariff rates in the current year. In the following year, the non-gas rate increases by approximately 4% for all customers. This rate increase actually *increases* an individual customer's incentive to conserve in the following year.

While it may seem counter-intuitive that decoupling increases the customer-level incentive to conserve, consider the decision-making process for one customer. Suppose that this customer knows that (1) the conservation program is in place, (2) it will likely lead others to reduce their usage levels and (3) therefore the program will cause an increase in the non-gas rate in the following year. The customer in this example will pay the higher rate in the following year regardless of whether he or she chooses to conserve. Therefore, the customer will evaluate the benefits of conserving energy by considering the full non-gas rate in the current year and a higher non-gas rate in the following year (due to the effects of the conservation program combined with the decoupling mechanism). This *increases* the incentive (relative to current rates in the absence of decoupling) to engage in long-term conservation activities, such as investing in a more efficient furnace.

Q. AIC IS INTERESTED IN IMPROVING THE ABILITY OF SOUTHWEST GAS AND ALL ARIZONA UTILITIES TO RAISE CAPITAL AT REASONABLE RATES TO MEET THE INFRASTRUCTURE NEEDS OF ARIZONA'S RAPID GROWTH. DO REVENUE DECOUPLING MECHANISMS ASSIST IN THAT GOAL AS WELL?

A. Yes. Decoupling reduces the variability in a utility's non-gas revenues and ensures that a fixed amount of non-gas revenue per customer is recovered as customers are added to the system. By making the level of non-gas revenue more predictable over time, decoupling is likely to improve an investor's view of Southwest Gas as an investment opportunity and, therefore, improve the Company's ability to attract capital at a reasonable rate. As Mr. Montgomery wrote in his direct testimony, the Company has not been able to earn its authorized rate of return since the last rate case, which has been a consistent trend for a decade or more. (Montgomery at p. 5.) In the absence of decoupling, the ongoing problems that the Company has had in achieving its allowed rate of return may be exacerbated by, among other things, the expansion of Demand-Side Management programs and the prospect of a national carbon tax. This would further endanger Southwest Gas's ability to compete for capital, which would be detrimental to the interests of both the Company and its ratepayers, unless the RDAP is approved.

Q. DOES DECOUPLING LEAD TO ANY OTHER POSITIVE OUTCOMES?

A. Yes. By providing increased stability in non-gas revenues, decoupling will, in all likelihood, reduce the frequency of rate cases. A reduction in the frequency of rate cases reduces costs for the Company, its customers and the regulator.

3. THE WEATHER NORMALIZATION ADJUSTMENT PROVISION

Q. WHAT IS THE PURPOSE OF A WEATHER NORMALIZATION MECHANISM?

A. Weather normalization mechanisms reduce the variability in non-gas revenue for the utility and reduce the variability of non-gas bills for ratepayers. Because of the use of natural gas for space heating, weather is a significant driver of fluctuations in natural gas usage from month-to-month and year-to-year. When non-gas costs are recovered through volumetric rates, weather fluctuations lead to significant variability in customer payments for, and utility receipt of, non-gas revenue. A weather adjustment mechanism adjusts non-gas revenue to reflect revenues that would have been collected under normal weather conditions.

Q. PLEASE DESCRIBE THE COMPANY'S PROPOSED WEATHER NORMALIZATION ADJUSTMENT PROVISION ("WNAP").

A. WNAP calculates customer-specific bill adjustments based on normal weather conditions, actual weather conditions and the customer's usage levels across months. It does so by first adjusting actual (metered) volumes to normal weather conditions. The volume adjustment is then used to calculate a bill adjustment, accounting for the effect of the block rates.

Q. HOW ARE WEATHER CONDITIONS MEASURED?

A. Weather conditions are measured in heating degree days ("HDDs"), which is calculated for each day (and then summed up across days within a billing month). This variable is intended to reflect the use of space heating appliances (none when the average temperature is above 65 degrees and increasing linearly below 65 degrees).

Q. HAS THE WNAP DESIGN BEEN USED IN OTHER JURISDICTIONS?

A. Yes. Weather normalization mechanisms have been implemented for at least 41 utilities in 20 different states.[2] Specifically, the WNAP design suggested by Southwest Gas is identical to the Weather Normalization Adjustment used by Questar Gas in Utah.

Q. WOULD YOU EXPECT THE WNAP TO BE EFFECTIVE IN REDUCING THE VARIABILITY OF THE COMPANY'S NON-GAS REVENUES AND THE RATEPAYER'S NON-GAS BILLS?

A. Yes. When winter temperatures are below normal, natural gas consumption increases, causing the Company to over-recover its non-gas revenues. This over-recovery comes at the expense of the ratepayers, who receive higher than normal bills in colder than normal months. The opposite outcome occurs in a winter month that is warmer than normal. That is, in a warm winter month, the utility will under-recover its non-gas revenues, while customers will pay bills that are lower than expected. WNAP reduces the variability of non-gas bills and revenue by removing the effects of changes in weather

[2] Daniel G. Hansen and Steven D. Braithwait, "A Review of the Weather Adjusted Rate Mechanism as Approved by the Oregon Public Utility Commission for Northwest Natural," Oregon Public Utility Commission Docket UG-152, October 2005, pp. 10-11.

conditions on customer usage levels, i.e., increasing non-gas revenue (and bills) in mild winter months and decreasing non-gas revenue (and bills) in cold winter months.

Q. WHY ARE THE ADJUSTMENTS MADE USING CUSTOMER-SPECIFIC DATA?

A. Because some customers are more weather sensitive than others. For example, a customer who only uses natural gas for cooking will not tend to change usage levels in response to changes in weather conditions. WNAP accounts for the differences across customers by calculating customer-specific bill adjustments based on each customer's usage levels in winter and summer months, using billing data from the summer months to determine the amount of usage that is not weather-sensitive.

Q. DOES WNAP SHIFT RISK FROM THE COMPANY TO ITS RATEPAYERS?

A. No. Both the Company and its ratepayers are exposed to risk caused by fluctuating weather conditions. Because a specific weather outcome (e.g., a cold winter month) benefits one party at the expense of the other, the weather risk can be offset for both of the parties through a weather adjustment mechanism. WNAP will reduce the variability of the non-gas portion of the bill for customers and reduce the variability of non-gas revenues for the Company.

4. HOW RDAP AND WNAP COMPLEMENT ONE ANOTHER

Q. IS IT A GOOD IDEA TO HAVE BOTH A DECOUPLING MECHANISM AND A WEATHER ADJUSTMENT MECHANISM?

A. Yes. By itself, the RDAP will adjust rates to account for fluctuations in non-gas revenues due to any source, including weather. However, the rate will not adjust until the following year. Therefore, RDAP alone does not address the month-to-month weather risk to which ratepayers are exposed. For example, in a cold winter month, customers' overall bills (including gas costs) will be higher than expected. The RDAP will refund a portion of the high bill through a reduction in the non-gas rate, but this rate decrease will not take effect until the following year.

In contrast, the WNAP will adjust the *current* bill for the effect of weather on the non-gas portion of bills. Therefore, under WNAP, ratepayers will receive immediate relief from the effects of a cold winter month.

In addition, because weather tends to be the largest driver of usage fluctuations, the fact that WNAP adjusts current non-gas revenues for the effects of weather reduces the size of the RDAP deferrals. That is, if RDAP and WNAP are both in place, RDAP deferrals will tend to be smaller (in absolute value) because the effect of weather on non-gas revenues is removed.

Q. PLEASE DESCRIBE HOW WNAP IS IMPROVED BY THE PRESENCE OF RDAP.

A. A key issue when establishing a weather adjustment mechanism is in defining normal weather conditions. For example, if the level of "normal" heating degree days is set too high, the weather adjustment mechanism will consistently work as though the winter is milder than average, leading to customer surcharges on average. However, if RDAP is present in addition to WNAP, the decoupling deferrals will correct any errors that occur because of an incorrect definition of normal weather. Continuing this example in which "normal" heating degree days are set too high and the WNAP will over-charge customers on average, the increase in non-gas revenues due to the WNAP bill adjustments is completely offset by the matching customer refund that is created in the RDAP BA.

It is difficult to determine the timeframe that should be used to define normal weather conditions (e.g., the previous 10, 20 or 30 years) and reasonable people can disagree on the issue. The fact that RDAP automatically adjusts non-gas revenues to account for any errors that may exist in the definition of normal weather used in WNAP is, therefore, a convenient and desirable attribute that effectively eliminates the need to debate the definition of normal weather conditions.

5. <u>RECOMMENDATIONS</u>

Q. WHAT ARE YOUR RECOMMENDATIONS REGARDING RDAP AND WNAP?

A. I recommend that the Commission approve both RDAP and WNAP. RDAP removes a disincentive that Southwest Gas faces in supporting conservation and energy efficiency programs. Importantly, it does so in a way that does not reduce the customer-level

incentives to engage in conservation and energy efficiency activities. Also, decoupling will likely reduce the frequency of rate cases by providing an automatic adjustment to allowed revenues based on the observed change in the number of customers served and by reducing the financial effects associated with changes in customer usage levels over time. In addition, by improving the stability of non-gas revenues, decoupling will, all else equal, improve Southwest Gas's ability to obtain capital at reasonable rates.

WNAP is appropriate because it reduces weather-induced risk for both the Company and its ratepayers. It accounts for the fact that customers differ in their weather sensitivity and provides customers with immediate bill relief in colder-than-normal winter months.

WNAP and RDAP function particularly well in combination. That is, WNAP reduces the size of RDAP deferrals (reducing the size of the annual rate changes due to RDAP), while RDAP eliminates the potential for errors in WNAP bill adjustments due to an incorrect normal weather definition that could otherwise skew WNAP payments toward either the Company or its ratepayers.

Q. DOES THIS COMPLETE YOUR TESTIMONY?

A. Yes.

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DGH-1

Daniel G. Hansen

RESUME

March 2008

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Academic Background:

Ph.D., Michigan State University, 1997, Economics
M.A., Michigan State University, 1993, Economics
B.A., Trinity University, 1991, Economics and History

Positions Held:

Vice President, Laurits R. Christensen Associates, Inc. 2006-present
Senior Economist, Laurits R. Christensen Associates, Inc., 1999-2005
Economist, Laurits R. Christensen Associates, Inc., 1997-1999
Research Assistant to David Neumark, 1995-1997
Instructor, School of Management, University of Michigan-Flint, spring 1996: MBA Business Economics

Academic Honors:

Trinity Presidential Scholarship, Trinity University, 1987-1991
American Express Scholarship, 1987-1991

Professional Experience:

I work in a variety of areas related to retail and wholesale pricing in electricity and natural gas markets. I have used statistical models to forecast customer usage, estimate customer load response to changing prices, and estimate customer preferences for product attributes. I have developed and priced new product options; evaluated existing pricing programs; evaluated the risks associated with individual products and product portfolios; and developed cost-of-service studies. I have conducted evaluations and provided testimony regarding revenue decoupling and weather adjustment mechanisms.

Major Projects:

Prepared testimony regarding the weather normalization of test year sales and revenues.

Participated on a regulatory proceeding panel to discuss decoupling mechanisms.

Prepared testimony regarding a proposed electricity decoupling mechanism.

Prepared a report and testimony regarding a natural gas decoupling mechanism.

Evaluated a model that estimated the costs associated with removing and relicensing hydroelectric facilities.

Assisted an electric utility in evaluating new rate options for commercial and industrial customers.

Designed and evaluated time-of-use and critical-peak pricing rates for an electric utility.

Reviewed cost-of-service study for a municipal electric utility.

Produced a report on rate design methods that provide appropriate incentives for demand response and energy efficiency.

Assisted in wholesale power procurement process.

Evaluated a weather-adjustment mechanism for a natural gas utility.

Assessed weather-related fixed cost recovery risk for an electric utility.

Evaluated a revenue decoupling mechanism for a natural gas utility.

Estimated price responsiveness of real-time pricing customers.

Evaluated the need for electricity transmission and distribution standby rates for a utility.

Developed a market share simulation model using conjoint survey results of electricity distributors.

Conducted conjoint surveyed of electricity distributors regarding rate structure preferences.

Developed a method to calculate a retail forward contract risk premium.

Prepared a report on the performance of Financial Transmission Rights (FTRs) in the PJM electricity market.

Reviewed a retail pricing model for use in a competitive electricity market.

Provided support in a natural gas rate case filing.

Simulated outcomes associated with alternative wholesale rate offers to electricity distributors.

Developed a business case to support a natural gas fixed bill product.

Assessed the accuracy of a natural gas fixed bill pricing algorithm.

Audited an evaluation of the costs associated with implementing a renewable portfolio standard.

Developed a model to value interruptible provisions in a long-term customer contract.

Performed a study on the determinants of electricity price differences across utilities and regions.

Developed long-term demand and energy forecasts.

Conducted market research to assess customer interest in new product options.

Recommended new retail pricing products for commercial and industrial customers.

Prepared a report on the fundamentals of retail electricity risk management.

Prepared a report that presented a taxonomy of retail electricity pricing products.

Presented at a workshop in Africa regarding deregulated electricity markets.

Prepared a report on the effectiveness of distributed resources in mitigating price risk.

Performed a valuation of energy derivatives consistent with FAS 133.

Created an electricity market share forecasting model.

Developed standby rates for an electric utility.

Developed an electricity wholesale price forecast.

Forecasted retail customer loads for an electric utility.

Assisted in mediating a new product development process with a utility and its industrial customers.

Developed a model that simulates wholesale market price changes due to retail load response.

Developed a pricing model for an innovative financial product.

Estimated changes in wholesale electricity prices due to customer load response.

Oversaw creation of software that estimates customer satisfaction with utilities.

Developed a model to economically evaluate a capital addition to a generator.

Developed a wholesale version of the Product Mix Model.

Evaluate Risk Implications of New Product Offering.

Mixed Logit Estimation of Customer Preferences.

Estimation of Customer Price Responsiveness.

Product Mix Model Workshops.

Unbundling and Rate Design.

Development of a Computer Program.

Large Commercial and Industrial Customer Rate Analysis.

Residential Customer Rate Analysis.

Survey of Power Marketers.

Development of Multi-Period Analysis Tool.

Evaluating the Effect of Alternative Rates on System Load.

Estimating the Persistence of Weather Patterns.

Electricity Customer Survey Data Analysis.

Product Mix Analysis for Small Customers.

Survey of Postal Facilities.

Professional Papers:

"A Review of Natural Gas Decoupling Mechanisms and Alternative Methods for Addressing Utility Disincentives to Promote Conservation," June 2007.

"Evaluation of the Klamath Project Alternatives Analysis Model: Reply to Addendum A of the Consultant Report Prepared for the California Energy Commission Dated March 2007," May 2007, with Laurence D. Kirsch and Michael P. Welsh.

"Evaluation of the Klamath Project Alternatives Analysis Model," March 2007, with Laurence D. Kirsch and Michael P. Welsh.

"A Review of the Weather Adjusted Rate Mechanism as Approved by the Oregon Public Utility Commission for Northwest Natural," October 2005, with Steven D. Braithwait.

"A Review of Distribution Margin Normalization as Approved by the Oregon Public Utility Commission for Northwest Natural," March 2005, with Steven D. Braithwait.

"Analysis of PJM's Transmission Rights Market," EPRI Report #1008523, December 2004, with Laurence Kirsch.

"Using Distributed Resources to Manage Price Risk," EPRI Report #1003972, November 2001, with Michael Welsh.

"Hedging Exposure to Volatile Retail Electricity Prices," *The Electricity Journal*, Vol. 14, number 5, pp. 33-38, June 2001, with A. Faruqui, C. Holmes and B. Chapman.

"Weather Hedges for Retail Electricity Customers," with C. Holmes, B. Chapman and D. Glyer. In papers for EPRI International Pricing Conference 2000.

"Worker Performance and Group Incentives: A Case Study," *Industrial and Labor Relations Review,* Vol. 51, No. 1, pp. 37-49, October 1997.

"Worker Quality and Profit Sharing: Does Unobserved Worker Quality Bias Firm-Level Estimates of the Productivity Effect of Profit Sharing?" Working Paper, May 1996.

"Supervision, Efficiency Wages, and Incentive Plans: How Are Monitoring Problems Solved?" Working Paper, November 1996, presented at the Western Economics Association Meetings, 1997.

"Has Job Stability Declined Yet? New Evidence for the 1990's," with David Neumark and Daniel Polsky, *The Journal of Labor Economics*, 1999.

Testimony and Reports before Regulatory Agencies:

Otter Tail Power Company, Docket No. E-017/GR-07-1178: Testimony regarding the weather normalization of test year sales and revenues in a general rate case on behalf of Otter Tail Power Company, 2008.

Connecticut Light & Power Company, Docket No. 07-07-01: Testimony regarding a proposed electricity revenue decoupling mechanism on behalf of Environment Northeast, 2007.

Questar Gas Company, Docket No. 05-057-T01: Testimony regarding the effectiveness of a natural gas revenue decoupling mechanism on behalf of the Utah Division of Public Utilities, 2007.

PacifiCorp, FERC Docket No. 2082: "Evaluation of the Klamath Project Alternatives Analysis Model: Reply to Addendum A of the Consultant Report Prepared for the California Energy Commission Dated March 2007," May 2007, with Laurence D. Kirsch and Michael P. Welsh.

PacifiCorp, FERC Docket No. 2082: "Evaluation of the Klamath Project Alternatives Analysis Model," March 2007, with Laurence D. Kirsch and Michael P. Welsh.

Northwest Natural Gas Company, Docket UG 163: Testimony relating to an investigation regarding possible continuation of Distribution Margin Normalization, May 2005.

Northwest Natural Gas Company, Docket UG 152: Submitted a report in compliance with a requirement to evaluate the functioning of the Weather Adjusted Rate Mechanism, October 2005.